

INTERACTIVE STRUCTURAL ANALYSIS FOR THE CONCEPTUAL DESIGN PHASE

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Abstract

Few tools are available which allows for structural analysis in the conceptual design phase. Common structural analysis software fails to meet some of the demands of this phase, attributing as a contributing factor to why structural demands are usually not incorporated into early design.

1. Introduction

Architects commonly conceive the geometry of a structure without much involvement of an engineer or with regards to structural demands in the conceptual design phase. This is in part because a lack of tools available to engineers in this phase. Developing tools that enables structural demands to be a more prominent part of conceptual design should result in overall better performing designs leaving the conceptual phase.

The importance of structural design is usually overlooked in the conceptual design phase [1]. Common structural design and analysis alternatives interface badly with the iterative and chaotic nature of conceptual design. Premature use of advanced structure analysis and design tools can negatively affect designers proneness to search for different, better performing alternative structural designs [2].

2. Development project

This work includes a development project of a simple structural design and analysis application. It utilizes a more direct interaction model adapted to the conceptual design phase. Emphasis was on creating a user experience that incite design exploration by developing a suitable user interaction model and a design comparison tool. The game engine Unity was used to aid the development of an interactive and engaging environment.

3. Results

Feedback and observation of users testing the application indicated that a more direct interaction model can enhance user engagement as well as proneness to design exploration, strengthening similar results in previous work done in this field. A developed tool, aimed at design comparison, was poorly used by testers whom argued that the tool was potentially powerful, but needs a more integrated implementation than the one used in this application, which did not engage users enough.

The modelling and analysing aspects of the application was enhanced by the more direct interaction model as well as the implementation of real-time results. This further indicate and support conclusions made in previous work, that more direct interaction models can enhance the users engagement with the design task [3-5].

References

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